influence which can be traced in the vestiges of religion, manners, architecture, language, and nomenclature over nearly all the regions of the East to which the name has been applied. Another name has been applied to the continental part of this region—Indo-China. This, too, expresses the fact that on this area the influences of India and of China have interpenetrated. But the influence of China has, except on the eastern coast, been entirely political, and has not, like India, affected manners, arts, and religion.

The address concluded with a long and interesting account of the land trade which has been maintained for many centuries between Western China and the Valley of the Iriwadi.

SECTION F.

ECONOMIC SCIENCE AND STATISTICS

OPENING ADDRESS BY THE PRESIDENT, LORD NEAVES

The greater part of this address deals with subjects beyond our scope; we may, however, make the following extracts:—

Economic science is sometimes spoken of as having a very modern date; but I think that this is an error. More or less the subject has entered into all the codes or systems of law that have been established from the earliest times. Alongside of political philosophy, which may be considered as peculiarly the science of government, great attention has always been bestowed upon matters which form an important part of political economy, or economic science—such as taxation, trade, commerce, wealth, and population. Those writers also who have presented us with ideal or imaginary states or Utopias are full of discussions and speculations of the same kind. The rival "Republics" of Plato and Aristotle afford abundant illustrations of this statement. It is peculiarly interesting to see this fact brought out so vividly in the admirable introduction to the "Republic" of Plato, prefixed to that treatise in Prof. Jowett's translation of that great philosopher; and if we had a similar translation and exposition of Aristotle's kindred work, which I think we might have from the hand of one of our own vice-presidents, to whom we owe so excellent an exposition of the "Ethics," we should see in a remarkable manner how many of the most interesting questions of the present day were considered and dealt with by those wonderful men according to the varying lights and tendencies which characterised their several minds. It is true that in more recent times a great advance has been made in economic science, and the chief feature and excellency of that change is the tendency to leave things as much as possible to their natural operation, and to the inherent laws of nature and society. It is to the credit of Scotland that she has produced the two greatest leaders in this altered movement—David Hume and Adam Smith—who are still high authorities on the whole subject, and whose principles have been made the basis of our recent legislation. The subject of Statistics is added to the title of this section as an auxiliary to the main subject of Economic Science.

The subjects to which statistics may be extended seem to be innumerable, and new ones are cropping up every day. In the pages of NATURE there lately appeared a letter of a somewhat curious kind, which may perhaps engage the attention of our fellow-associate member Mr. Tyler. The suggestion in that letter was that the degree of civilisation existing in any country is connected with the quantity of soap there consumed. The writer gave as a formula the equation of

$$x = \frac{S}{P}$$

x being the amount of civilisation inquired for, S being the soap consumed, and P the population consuming it. So that the amount of civilisation depended on the proportion of S, the numerator, to P, the denominator. If S is large in proportion to P, then the civilisation is great, and *vice versâ*. How the civilisation of Scotland in the olden times would come out according to this test I shall not inquire; but if there is any truth in the proposition, it gives additional relevancy and interest to the question which is sometimes vulgarly put by some people to their friends as to how they are provided with that commodity. I have not yet seen any tables framed upon this principle, but I have no doubt that the Registrar-General will keep it in view. An inquiry of a more serious nature, and indeed peculiarly important and impressive, is connected with one of the most remarkable phenomena in human nature—I mean the occasional appearance in the world of men of great genius. From time to time men have arisen whose mental powers have far transcended the ordinary average of human intellect, and who have thereby been enabled, within the space of a single life, and by the effort of a single mind, to give an impulse to science and discovery which they could not have received through long generations of average mediocrity. Whether this singular boon and blessing to mankind can be traced to any law is a natural but mysterious inquiry. Some persons have considered the production of exceptional genius as quite an insulated fact; and Savage Landor declared that no great man had ever a great son, unless Philip and Alexander of Macedon constituted an exception. Mr. Galton, however, in his interesting work on "Hereditary Genius," has endeavoured to prove that genius runs in families, or, at least, that men of genius have generally sprung from a stock where great mental power is conspicuous; and he adheres to the view commonly taken as to the importance of the maternal character and influence in the formation of genius. I do not venture to give any opinion upon Mr. Galton's theory, but his book contains an important collection of facts bearing on the subject, and a great deal of very curious collateral speculation. Mr. Galton attributes great power in many ways to the principle of *heredity*, as it seems now to be called. He does not indeed go so far as the Irish statist, who, as mentioned by Sydney Smith, announced as a fact that *sterility was often hereditary*; but he states that comparative infertility is transmitted in families; and adduces as a remarkable example, a fact not generally known, if it be a fact, that in the case that frequently happens of Peers marrying heiresses, the family is apt to die out very soon, the heiress being naturally, in the general case, an only child, and bequeathing to her descendants a tendency to produce small families, who do not afford the usual chance of a numerous supply of descendants. Whatever may be said of some of his other opinions, I hesitate to concur with Mr. Galton in his proposition that as it is easy "to obtain by careful selection a breed of dogs or horses, gifted with peculiar powers of running, or of doing anything else, so it would be quite practicable to produce a highly-gifted race of men by judicious marriages during several consecutive generations." I doubt greatly the practicability of such a plan; and suspect there are some elements in human nature that would counteract it. Persons of proud family descent have often a horror of mesalliances; but I scarcely think it would be possible to inspire people of genius with the same *esprit de corps* or desire to wed with those on a par with them. Men of genius don't seem to me apt to fall in love with women as clever as themselves, and I rather suspect the tendency is to look for some difference of character, an instinct of which it is the object, or at least the result, to keep up the average of talent rather than to multiply the highest forms of mental power. At any rate we may here ask poor Polly's question, "Can love be controlled by advice?" and however we may in other respects agree with Horace's maxim, "Fortes creantur fortibus et bonis," I question whether a high mental stature could be maintained by coupling male and female genius together, or whether the experiment might not fail as signally as it is said sometimes to have done with Frederick William's attempts to breed Grenadiers. I strenuously advise, however, that a marriage with a fool of either sex should be always considered as a mesalliance, and I would particularly warn the ladies against such a step, taken, sometimes it is said, in the hope that their sway may in that way be more easily maintained. A fool is as difficult to be governed as a mule, and the couplet, I believe, is strictly true, that says—

> Wise men alone, who long for quiet lives,
> Wise men alone are governed by their wives.

SCIENTIFIC INTELLIGENCE FROM AMERICA[*]

THE geological expedition under Prof. Hayden, at last advices, had reached Fort Hall, in Utah, on June 21, after a march from Ogden, during which much of interest was obtained by the party. The heat was very great, reaching from 95° to 105° in the shade during the day, with a difference of 25° to 35° between the wet and dry bulb thermometers. The party expected to pass Fort Ellis by the middle of July, on its way to the basin of the Yellow Stone Lake, where it will probably spend the greater part of the season. Mr. Thomas Moran, of Philadelphia, and Mr. Bierstadt, were to join the expedition before long for the purpose of making sketches for paintings.—In the August number of the *American Journal of Science*, will be found a continuation of the important communications by Prof. Marsh, of Yale College, in regard to the results of his expedition to the Rocky Mountains during the past year. In addition to a number of new fossil mammals allied to the woodchuck, the gopher, the squirrel, the dog, and the fox, he presents a notice of sundry new species of birds from the Tertiaries of the West. Among these is an extinct species of eagle of large size, a turkey, and an owl.—In the search for new regions of exploration and discovery, it is not a little surprising to be assured that, taking the West Indies as a group, we know almost as little of their natural history as we do of that of Central Africa, especially of the islands east and south of the Greater Antilles. Thanks to the labours of Dr. Gundlach, and Prof. Poey in Cuba, of Dr. Bryant in the Bahamas, of Mr. March and Mr. Gosse in Jamaica, of Mr. A. E. Younglove in Hayti, of Dr. Bryant, Mr. Swift, and Mr. Latimer in Porto Rico, of Mr. Swift in St. Thomas, of Mr. Galody in Antigua, of Mr. Julien in Sombrero, and of Mr. Newton in Santa Cruz, we have a fair knowledge of the birds of the islands mentioned ; but of Anguilla, St. Martin, Barbuda, Nevis, Montserrat, and Grenada we know nothing ; and of St. Bartholomew, St. John, Saba, and Barbadoes, next to nothing. Dominica, Martinique, and Guadaloupe have been more or less explored by English and French naturalists, although with no very complete result. We are glad to see that the Zoological Society of London is printing a paper by Dr. Sclater upon a collection of the birds of Santa Lucia, sent to the Society by Mr. De Voeux, in which twenty-five species are enumerated, and among them three entirely peculiar to the island, one of them, a species of oriole, being hitherto undescribed. To such of our readers as have a spirit of enterprise, and are desirous of visiting a region which is sure to reward them with rich and undescribed treasures in natural history, we earnestly recommend the smaller West India islands, to which a trip can be made, especially in the winter season, with little or no risk to life or health, and with ample promise of satisfactory results.—We have before us the annual report of the trustees of the Museum of Comparative Zoology in Cambridge, for the year 1870, containing interesting communications from Prof. Agassiz, as the director, and his corps of able assistants. We are glad to learn that the temporary indisposition of the director (now happily past) has not crippled the efficiency of the establishment, and that so much progress has been made in arranging the immense stock of specimens that has been gathered within the walls of the museum from all quarters of the globe. The addition of a number of trained European naturalists, as Dr. Steindachner, Dr. Maack, Dr. Hagen, &c., has given great strength to the scientific corps, and has enabled Prof. Agassiz to do much toward realising the magnificent plan that he has proposed, for the permanent arrangement and utilisation of the collection.—We have referred, in a previous article upon American explorations into the fauna of the deep seas, to the proposed work, during the current season, of Mr. J. F. Whiteaves, the accomplished secretary and curator of the Natural History Society of Montreal ; and we now give a more detailed account of his expected movements. This gentleman has been in America for several years, bringing with him an excellent record as a zoological investigator. Soon after his arrival in this country, he associated himself with the Montreal Society of Natural History, and has since that time been working sedulously in its interest. In 1867 he spent a fortnight in Gaspé Bay, where he prosecuted an extended system of dredging, and revisited the same region in 1869, extending his labours to the Gulf, between Cape Rozier lighthouse and Shiphead. Large numbers of marine invertebrates were collected by him, among them two species of shell new to America ; but no dredging was prosecuted at a greater depth than sixty fathoms. The object of his expedition of the present year is to carry on work in deeper water, and for this purpose he expected to start in the schooner *La Canadienne* on the 5th of July, to cruise along the north shores of the Gulf as far as Anticosti, or beyond. He goes prepared to prosecute his labours in the deep sea (two to three hundred fathoms) on each side of that island ; and from his experience in such researches, and the information derived from the later American and English deep-sea explorations, we have reason to hope for many important discoveries.—The cultivation of the natural and physical sciences has not been prosecuted with much success, as far as the announcement of new facts is concerned, by the Spanish-American races of the New World, although in nearly every State there is a society devoted more or less to such objects. Of late years, however, an increasing degree of vitality has manifested itself in these organisations, and there is reason to believe that in time they may be of considerable value. The most prominent institutions of the kind at present are in Mexico, namely, the Geographical and Statistical Society and the Society of Natural History ; both of them publishing Transactions which embody much information in their pages. The Royal Economical Society of Havana has published a bulletin of its proceedings, although devoted more to historical than scientific subjects. The most active society in Havana, however, is the "Royal Academy of Medical and Physical and Natural Sciences." Of this Dr. Gutiërrez is President ; Don Francisco de Sauvalle, Vice-President ; Dr. Antonio Mestre, Secretary-General ; Don José F. de Castro, Corresponding Secretary ; Dr. Felipe Rodriguez, Assistant-Secretary ; Dr. Ramon L. Miranda, Treasurer ; and Dr. Juan Calixto Oxamend, Librarian—all holding their offices until 1873. Institutions in Brazil, Buenos Ayres, and Chili also exhibit a commendable degree of activity.

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[*] Contributed by the Editor of *Harper's Weekly*.

Prof. C. F. Hartt, of Cornell University, has lately issued a circular announcing his intention of starting on a fourth expedition of scientific research to Brazil. This gentleman has been long and favourably known for his efforts in regard to the exploration of that portion of South America, having made his first journey in 1865 as one of the *attachés* of the Thayer expedition under Prof. Agassiz. In 1867 he made a second journey alone to the Brazilian coast, taking Bahia as his centre, and covering an extensive area around that point, including a trip to the Abrolhos Islands. These two expeditions included a large part of the coast from Rio to Pernambuco, a district of about one thousand miles. A third visit was made in 1870 to the valley of the Amazon, to clear up certain points at issue between himself and Prof. Agassiz in regard to the geology of that country. The funds for this expedition were furnished in part by a friend of science, whose name he is not permitted to give, with a contribution by Colonel Edward Morgan of one thousand dollars, and by Prof. Goldwin Smith of five hundred, besides small sums from other parties. Assistance was rendered by the Brazilian authorities in furnishing a small steamer with a suitable amount of coal. The collections made on this expedition were very extensive, and embraced objects of all kinds, including ethnology and anthropology. The fourth expedition, now contemplated, is intended to complete the survey of the eastern part of the Amazonian Valley, especially in its zoological relationships, and further to investigate the Indian mounds of Marajo, and to collect data in reference to the languages of the people of the country. The sum estimated as necessary for this expedition is four thousand dollars, of which five hundred have already been contributed by Harvard University ; and we trust that the friends of science who may have the means at their command will not fail to respond to the appeal of Prof. Hartt by furnishing pecuniary assistance, either without conditions or with the understanding that a certain portion of the collection is to be supplied to the contributors in return. It is understood that Messrs. Osgood and Co., of Boston, have engaged a series of articles upon the expedition, to be published in *Every Saturday*, and afterwards to be collected in book form.

The Hydrographic Office of the Bureau of Navigation of the United States has lately published a monogram upon the Marshall group of islands in the North Pacific. This group consists of two chains of islands, lying nearly parallel with each other, and running north-west and south-west from lat. 11° 50′ N. to 4° 30′ N., and from long. 167° E. to 173° E., covering an area of over 350 by 400 miles in extent, and very little known to navigators, the information hitherto on record being considered very unreliable. The eastern chain is known as the Radack, and the western as the Ralick, each numbering from fifteen to eighteen groups of low coralline islands, the greater number of which are fully formed atolls—that is lagoons of greater or less extent—with deep water and anchorages, surrounded by a chain of reefs, connecting islands, with one or more passages through the reefs into the lagoons, most of which are navigable for large vessels, besides which there are numerous boat passages. The earliest discovery of this archipelago is said to have been by Laévédra, in 1529 ; and the next visit made to them was by Anson, in 1742. Since then the islands have been touched at by different navigators at various times, although until the appearance of the report just referred to but little definite information had been brought together of the archipelago as a group. A missionary establishment was started on one of these islands in 1857, which continues to be successful to the present time. The inhabitants numbered, at the latest accounts, 10,000. They are expert navigators, and perform journeys throughout the group. They are dark, with straight hair, and are said to be intelligent and hospitable.—Mr, Alphonse L. Pinart, the French naturalist, who is engaged in a scientific exploration of Alaska, announces his arrival at Unalaska on May 24, and his intended departure at an early day for Nusgajak. We hope to lay before our readers, from time to time, the important features of the progress of this expedition.—A correspondent of the *Weekly* writes to report the occurrence of a lunar rainbow at his residence, Oxford Depôt, New York, on the 2nd July last. At nine o'clock in the evening of that day a heavy rain-storm came up from the west, and when the sky was about half obscured a very distinct and beautiful rainbow made its appearance, having an arc estimated at 90°. The top of the bow was a deep blue, the lower side red; and between the two colours appeared a distinct hazy green. The moon was just rising at the time, and the perfect bow was visible for about five minutes, and partially distinguishable for a quarter of an hour.

SOCIETIES AND ACADEMIES

PARIS

Academie des Sciences, July 24.—No elections took place, but the members were rather numerous, as a secret committee is to take place at the close of the public sitting to discuss the merits of candidates. The secret committee was rather long, and a lively conversation took place. M. Lacaze-Duthiers was presented at the head of the list. After him came M. Gervais, and on the third line MM. Dareste and Alphonse Milne-Edwards. Each of these four gentlemen has respectable qualifications. M. A. Milne-Edwards is the son of M. Milne-Edwards, the great naturalist, who is chief of the section where the vacancy is to be filled up.—In the public sitting, M. Chasles gave a new series of theorems, which are to be demonstrated; but as they belong to a certain family of properties, and arranged *seriatim*, the very enunciation of them is more than half of the work to be done. These theorems are sixty in number, and are styled "Properties of geometrical curves relating to their harmonic axes," but none of them are of primary importance.—An observation was sent to M. Leverrier with respect to the great bolide of the 18th July, which was seen at La Guerche (Cher). Its course was from ϵ Cygni to α Pegasi. No track but a great quantity of light, first white and afterwards red; local time 11h. 5m., duration 3″.—Details were given by M. Sainte-Claire Deville of a bolide seen on the night of 17th and 18th March. A bolide was seen also in Italy by P. Denza at Moncalieri, but the accounts do not agree. It is supposed that P. Denza saw another bolide, which is not much to be wondered at, as the 18th of March is considered to be favourable for the appearance of large meteors, and P. Denza says he saw many of them on that very night when there was no moon.—P. Secchi sends a new letter "On solar protuberances and the relations between faculæ and spots; the communication cannot be condensed.—M. Delaunay presented a new volume of the "Annales de l'Observatoire National," the twenty-third of the collection, and full of observations.—The Academy appointed a committee for the Bordin prize, which will be given for the best memoir on the Comparison of the Natural Productions of South Africa, South America, and South Australia, as well as intermediate lands. The programme was very cleverly drawn up, and answers most admirably to the controversies on the "Origin of Species." The election was contested, and MM. Milne-Edwards, Brongniart, Elie de Beaumont, Quatrefages, and Decaisnes, were appointed. The report will be written with great care.—An invitation was addressed to the Academy by the International Congress, which will meet at Antwerp on the 22nd August; no formal answer is given to it.—M. Berthelot, who for some time had not published any report in the *Comptes Rendus*, attempted to give a very clever explanation of the immense explosive force of some organised compounds derived from nitric acid. He says that there is an intimate union between nitric acid and the organic matter upon which the acid has acted. But the action takes place with scarcely any heat being produced. The heat is kept in reserve within the molecules of the explosive body for future action. His theoretic views are supported by calorimetrical experiments. Thus an equivalent of nitric acid being employed in the manufacture of nitro-benzine, gives only 4,300 calorics, and in the fabrication of nitric ether 6,000 calorics. Nitric ether being inexplosible, the greater explosibility of nitro-benzine can be explained by the 1,700 calorics.—M. Milne Edwards presented, in the name of M. Joly, a paper on a transformation which *Palingenia virgo* undergoes before its final metamorphosis. These intermediate and imperfect metamorphoses are less scarce and exceptional than was supposed—M. Ledillat, who is a very learned Arabic scholar, as well as a very good astronomer, sent a paper to support his previous assumption relative to the immense number of Arabic words which are to be found in the French language. His views will be supported by every Frenchman acquainted with the Arabic language, and there are a good many owing to the occupation of Algiers, and all these Arabic etymologies were omitted systematically by M. Littré in his great Etymological Dictionary.—An electro-magnetic machine on a new plan for exciting continuous currents was exhibited on the 17th by M. Gramme, who was highly praised by M. Jamin. M. Bazin raised a claim for the priority of the invention, and a paper placed by him in the hands of the perpetual secretary in the sitting of the 10th July was opened. The description given by him is similar. But the construction of M. Gramme's machine was certainly in full operation by that time.—We learn with much concern that M. Saigey, a very clever philosopher and mathematician, who had contributed many very valuable papers to the *Comptes rendus*, and to several scientific periodicals, and who was the author of many interesting books on scientific matters, died from actual want during the Communist insurrection. He was found dead in his room on the 19th of May, after having been left unassisted during more than three days. M. Saigey was a genuine free thinker and a Republican by heart. He was expelled from the Normal School when twenty-four years old, under the Bourbons, in consequence of his liberal opinions. He remained true to his colours during his whole life, had never a single appointment from the State, and died of starvation when seventy-four years old.

July 31.—M. Faye in the chair.—M. Lacazes-Duthiers was elected a member by a large majority to fill the room of M. Longet. The new academician is a very accurate observer, who inaugurated his scientific career by discovering the extraordinary reproductive system of corals by the inspection of corals living on the Algerine sea coasts. Every year he has spent his summers at some sea-side station in order to enlarge his knowledge of inferior organisms. He will be a very useful member.—The election for a free member will take place on August 7. M. Belgrand, a meteorologist and an engineer, will very likely be returned. Some opposition is expected, although according to every probability it will not be successful.—A letter from M. Janssen was read with respect to the observation of the next total eclipse, but the discussion was postponed till after the next meeting of the Section of Astronomy, which intends to propose an expedition.

BOOKS RECEIVED

ENGLISH—Handbook of British Fungi, 2 vols.: M. C Cooke (Macmillan and Co.).-Sir Isaac Newton's Principia, edited by Sir W. Thomson and H. Blackburn (Glasgow: J. Maclehose).—A Digest of Facts relating to the Treatment and Utilisation of Sewage, 2nd edition. W. H. Corfield (Macmillan and Co.).—The Estuary of the Firth and Adjoining Districts Viewed Geologically: D. M. Home (Edinburgh: Edmonston and Douglas).

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